RSM FY12 IPR
Galveston District
Matagorda RSM

Tricia Campbell, Operations Manager
Samantha Lambert, Hydraulic Engineer

- ***Galveston District***
- ***Custodians of the Coast***

- **US Army Corps of Engineers**
- **BUILDING STRONG®**

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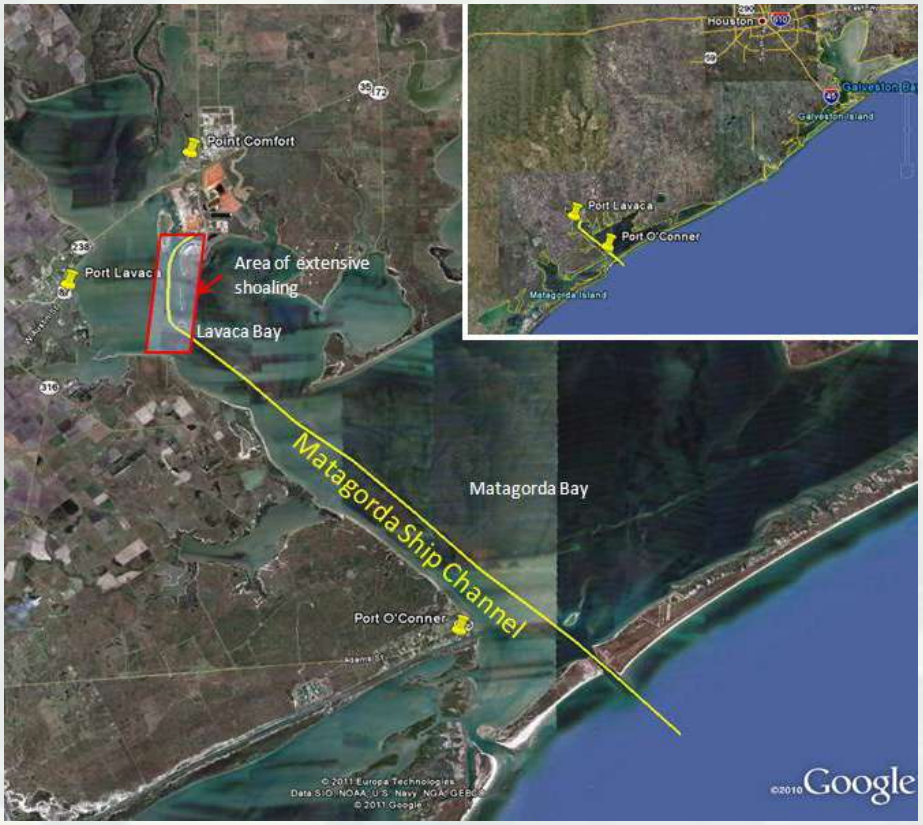
Description/Challenge

- Area of Extensive Shoaling in Matagorda Ship Channel
- Annual Draft Restrictions = Annual Dredging Requirements
- Limited Funding for Dredging



Goals/Issues to Address

- Determine source of sediment
- Develop alternatives to reduce the deposition of sediment into the ship channel
- Implement alternative(s) which can effectively reduce shoaling and provide increased time between dredging cycles

BLUF: Implementation of alternatives which can reduce shoaling in the Matagorda Ship Channel will benefit deep draft ports, industry, and USACE by enabling SWG to more effectively manage the maintenance of the channel in order to ensure reliable deep draft navigation.

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PDT Members

SWG
- Tricia Campbell, Operations Manager
- Sheri Willey, Planning Lead
- Samantha Lambert, Hydraulic Engineer
- Andrew Smith, Civil Engineer

ERDC
- Robert Thomas, Research Hydraulic Engineer
- Lihwa Lin, Research Hydraulic Engineer
- Honghai Li, Research Physical Oceanographer

Stakeholders and Partners
- Ports of Point Comfort, Port Lavaca, Port O'Conner
- Calhoun County Port Authority

Leveraging/Collaborative Opportunities
funding, data, tools, models, etc
with Other Projects, Programs, Partners, etc
- CIRP
- DOER
- Existing models

Milestones/Deliverables
- Sediment Budget, 6/30/12, 100%
- Model Calibration, 4/6/12, 100%
- Selection of Alternatives, 5/2/12, 100%
- Testing of Alternatives w/ Refined Model, 6/15/12, 100%
- Report, 9/30/12, 95%
- Coordinate implementation of solutions (FY13)

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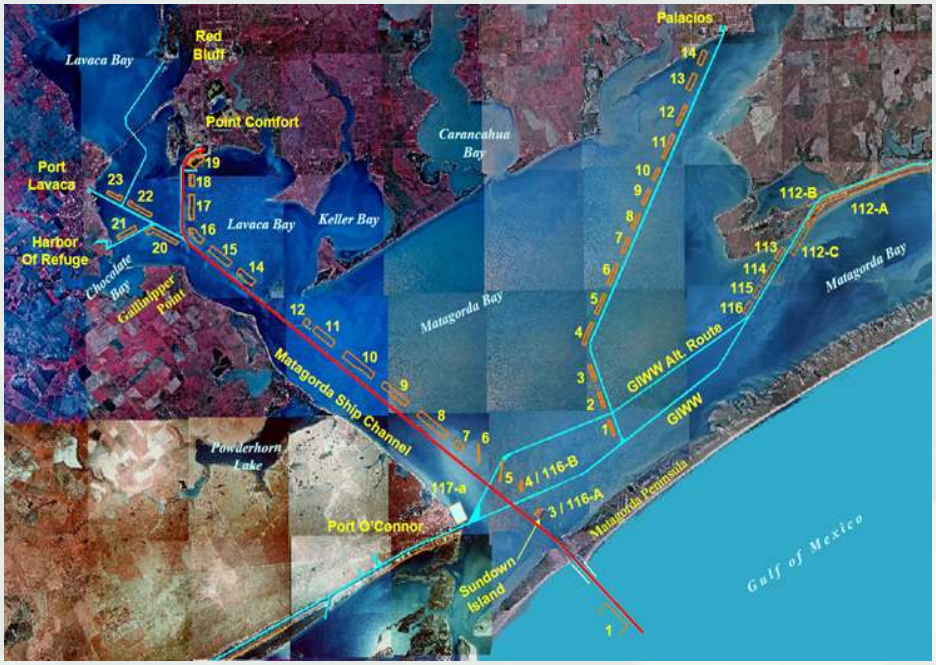
Approach
- Data search and review
- Gathered condition surveys for CMS modeling
- CMS modeling performed for currents, sediment movement, and fluid mud
- Calculated sediment volume placed into open water placement areas adjacent to the channel
- Developed sediment budget in SBAS
- Identified alternatives and used CMS to model them to see which was most effective

Benefits to O&M, FRM, Environmental
- Hopefully will solve shoaling problem in upper reaches (save money).
- Have a better understanding of how sediment moves in system.
- Find opportunities for future RSM studies in area.

Models, Tools, Databases, etc Used
- Past Reports,Studies
- Dredging History Database
- Condition Surveys
- CMS Modeling for Currents, Sediment and Mud for Without Project and Alternatives
- SBAS Sediment Budget



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Opportunities to take action:
move/optimize sediment
Improve efficiencies

- Alternative to relocate PA's to west side of channel in upper reach
- Fluid mud is an issue – important to find better ways to measure nautical depth.
- Opportunity to use geotubing or build a wall adjacent to channel in high shoaling area (historically used geotube successfully between PA's 18 and 19)
- Looked at fully contained beneficial use area

Accomplishments

- Verified shoaling in upper reaches of MSC was problematic with survey data, dredging history database data and CMS modeling
- Developed alternatives and modeled them in CMS to see which worked best
- Developed sediment budget for Matagorda bay system which will be useful for any future projects in the area

Volume of Sediment Moved

- Known quantities in channels from Dredging History Database.
- Several Unknown Quantities:
- Amount re-circulating from PA's is unquantified. (Estimated 10% in lower MSC and 20% in upper reaches). Could be higher.
- Amount of fluid mud (Assumed 20 to 30% of sediment in cell below moves upstream)
- Amount of sediment flowing into channel from bays

Lessons Learned

- Dredging History Database Incomplete….lots of questions when looking through data.
- Only had condition surveys (no before and afters) so it was hard to tell when dredging actually occurred. May have impacted CMS analysis.
- Lots of unknowns…more studies are needed to better identify the "quantities" for the source materials in the sediment budget.

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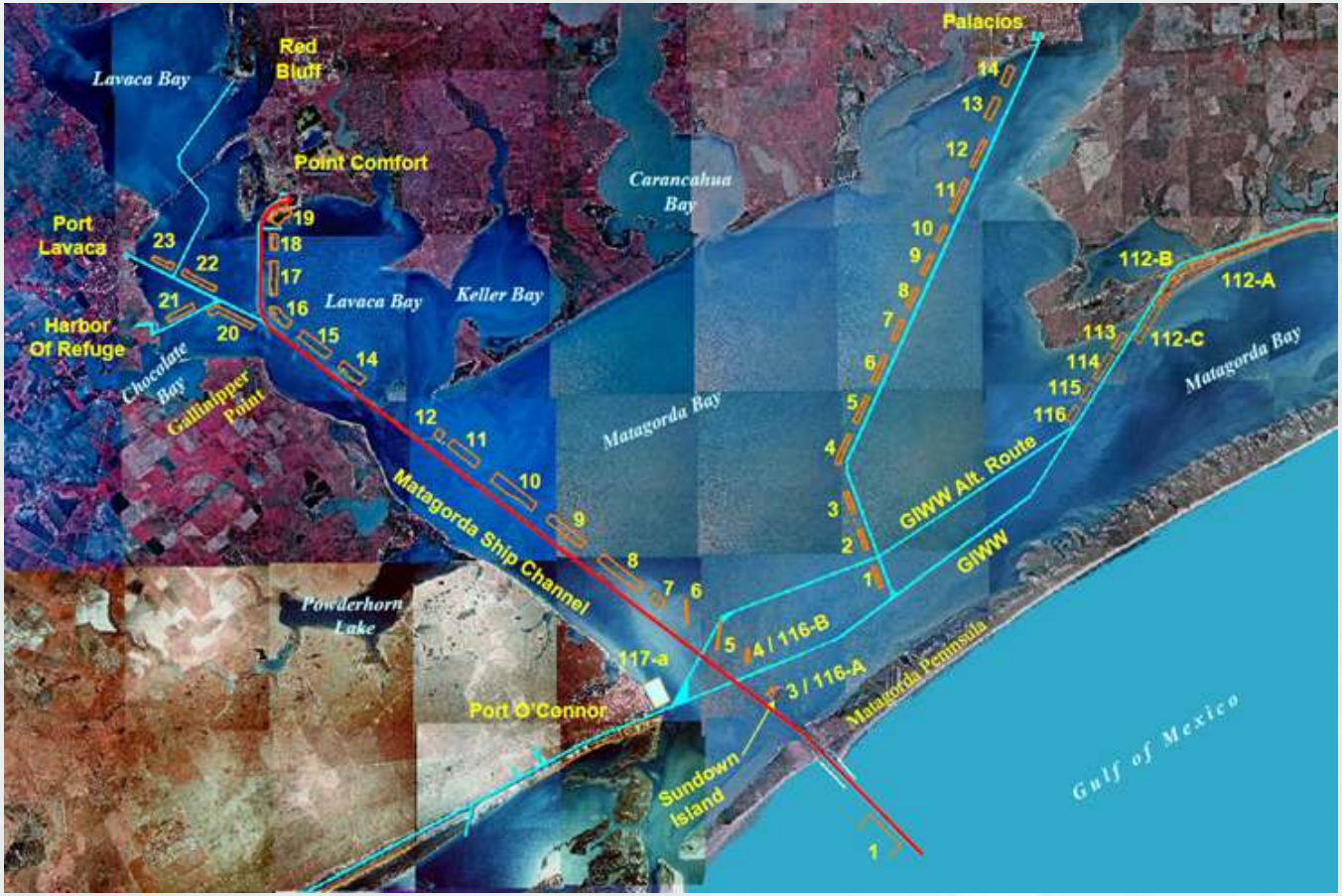
Site Overview

•Present Configuration of Matagorda Ship Channel (MSC), 200’ wide, 36’ deep, was built in 1962.



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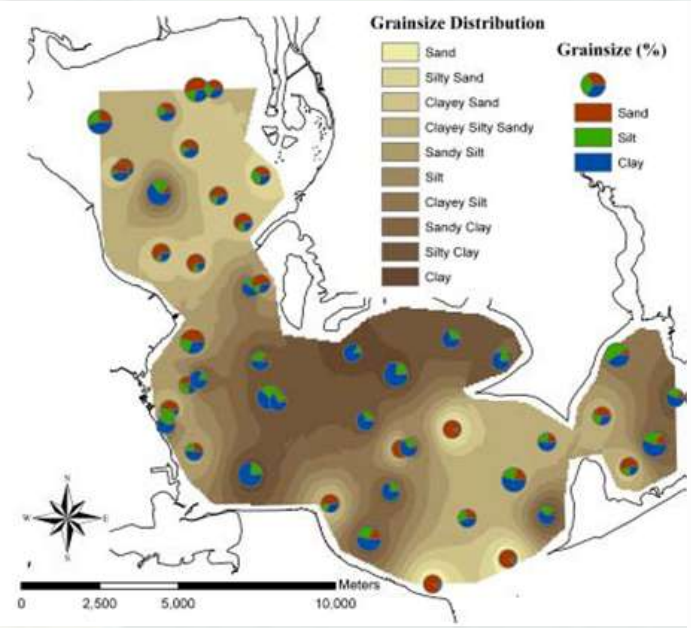
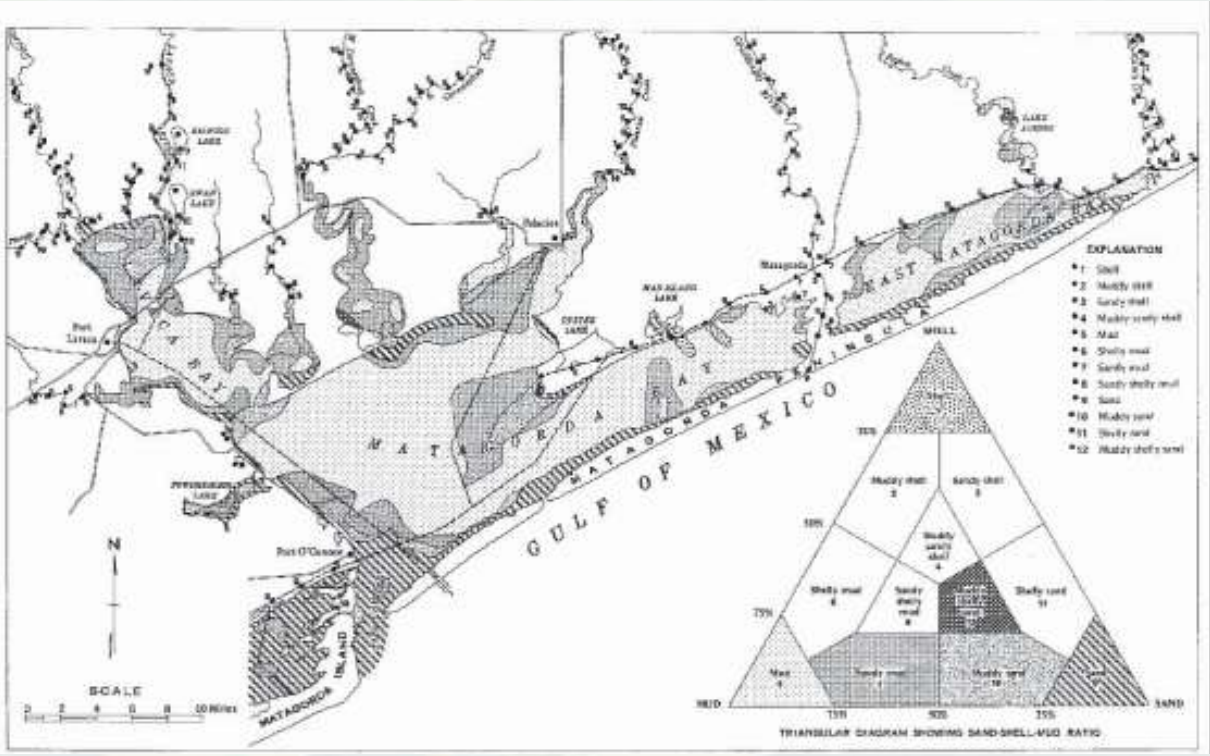
Prior Sediment Studies



•(Bronikowski, 2004)



•(McGowen, Byrne, Wikinson, 1979)

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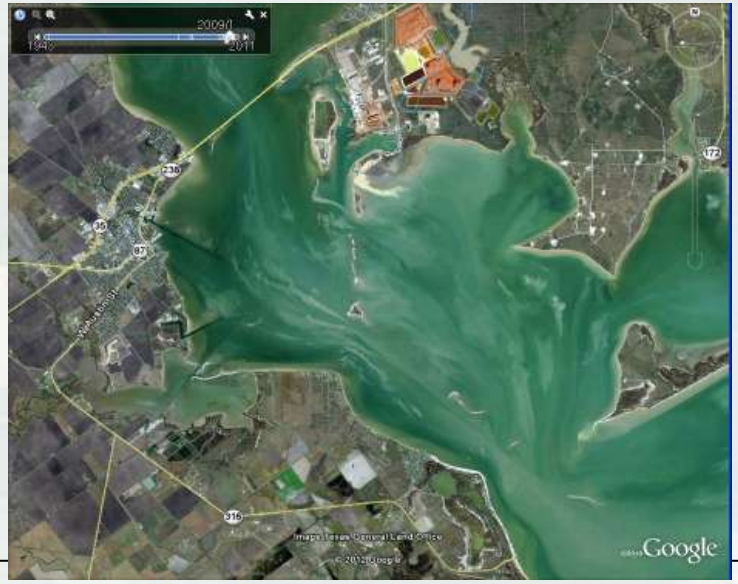
Problem Area



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Sediment Budget (SBAS)

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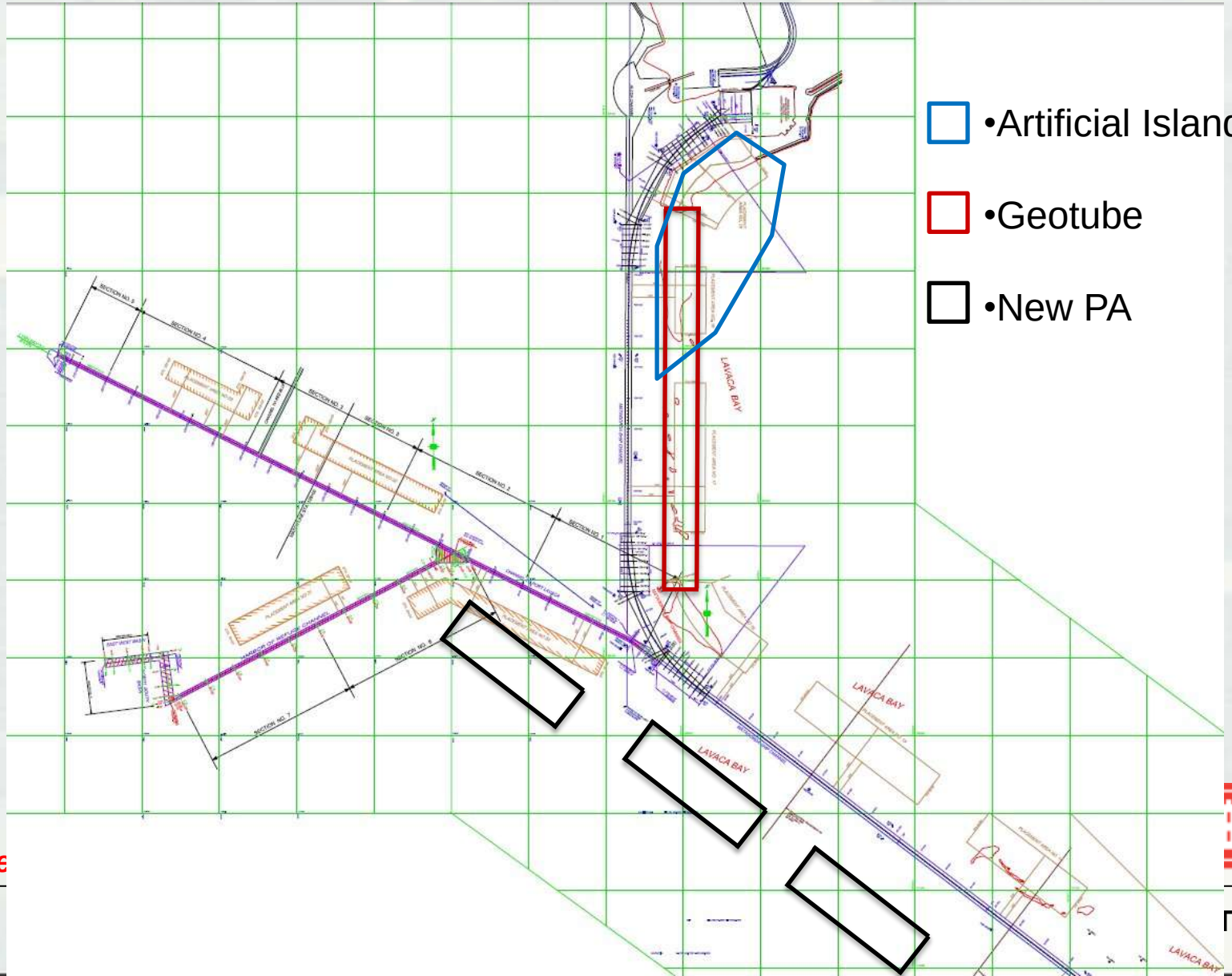
Alternative Identification



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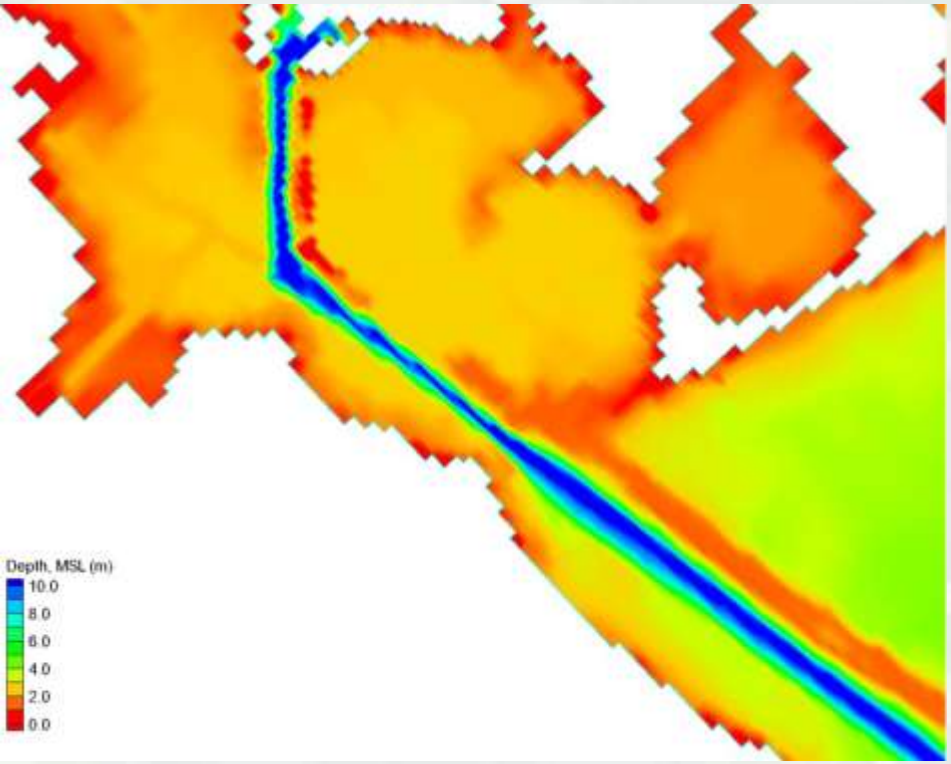
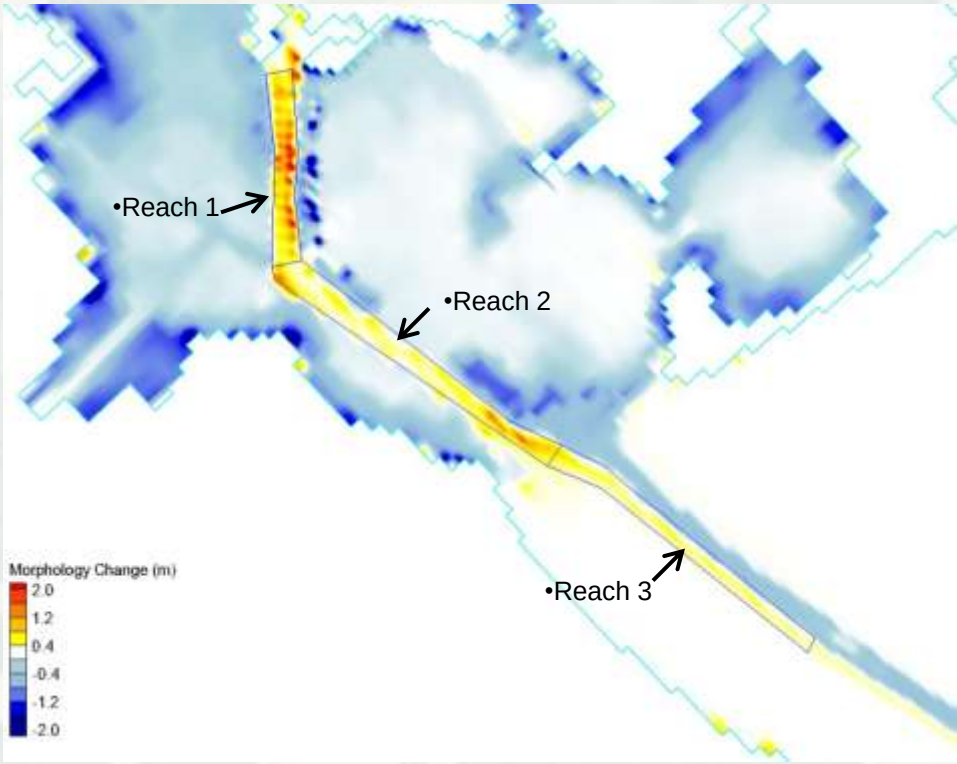
Morphology Change

•Existing Condition - Sep 2006 to Feb 2007





•Initial depth

Cumulated depth change

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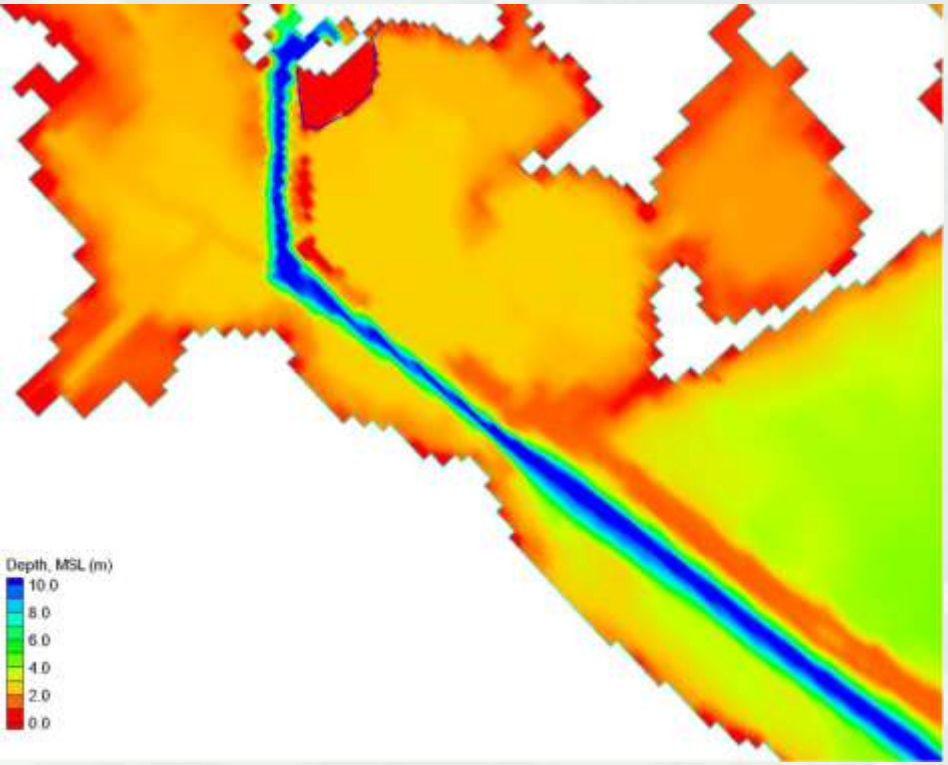
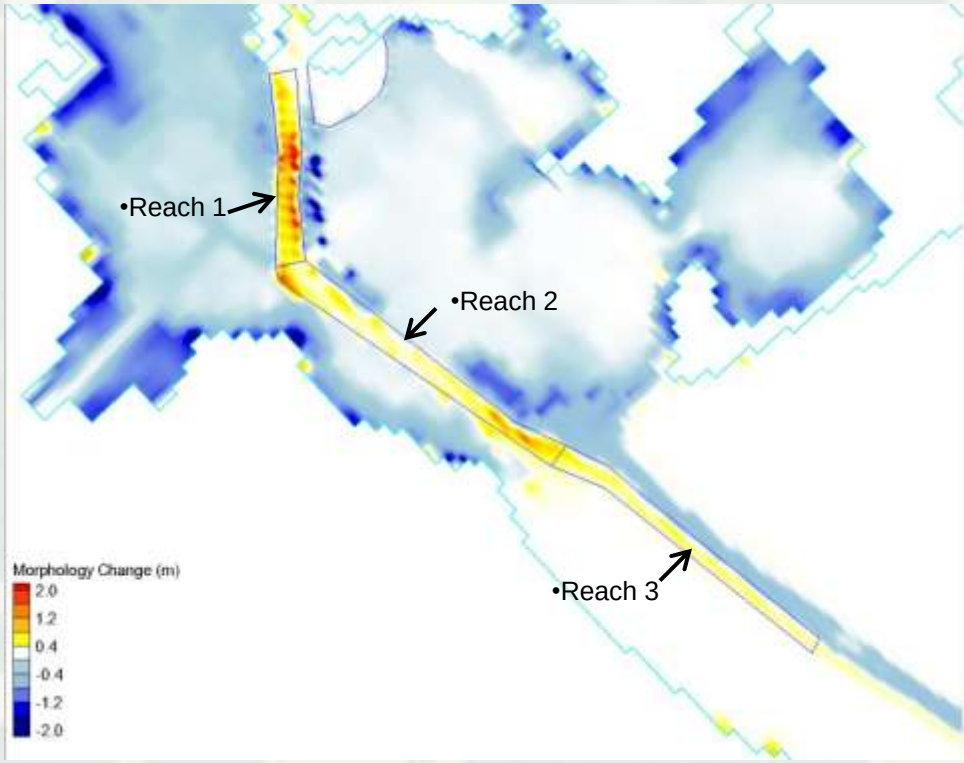
Morphology Change

•Alt 1: Artificial Island - Sep 2006 to Feb 2007





•Initial depth

Cumulated depth change

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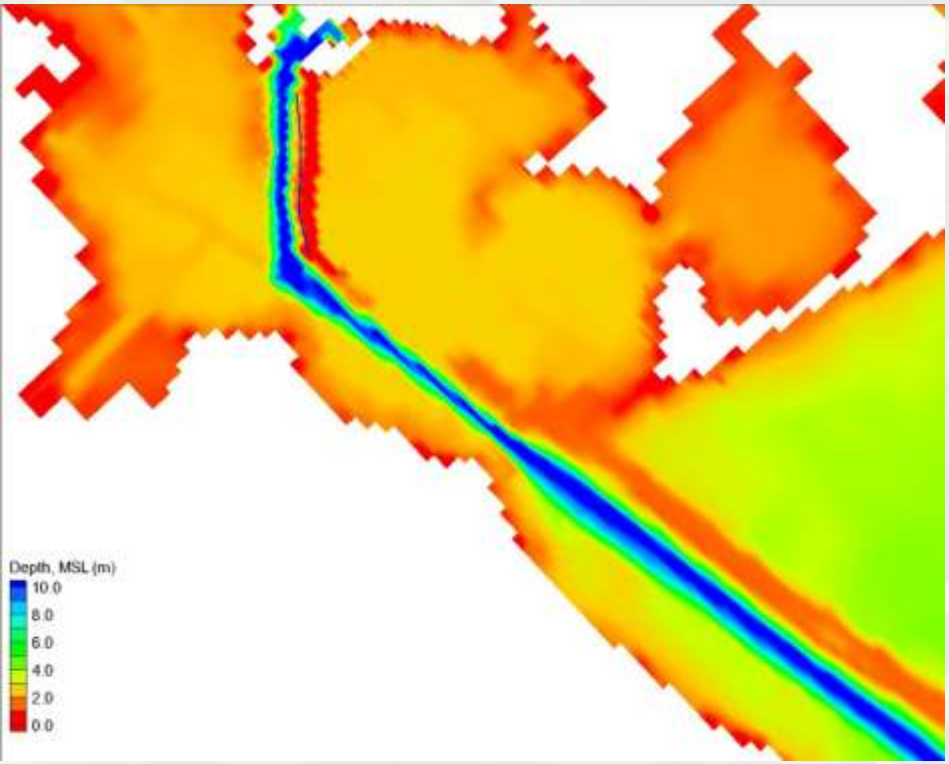
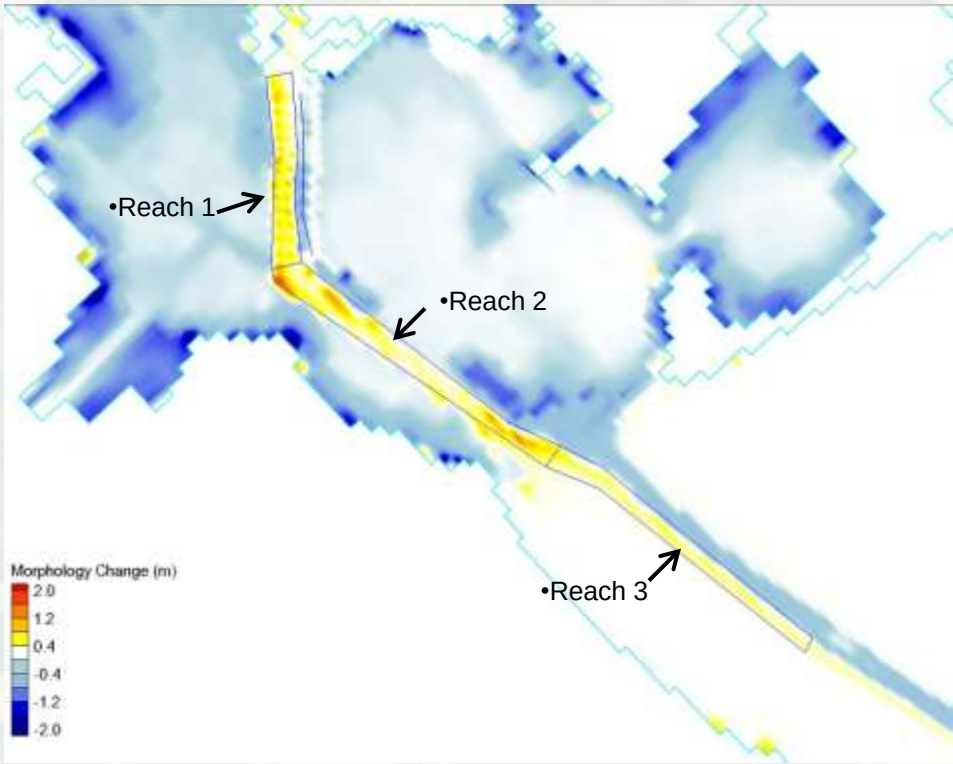
Morphology Change

•Alt 2: Geotube - Sep 2006 to Feb 2007





•Initial depth

Cumulated depth change

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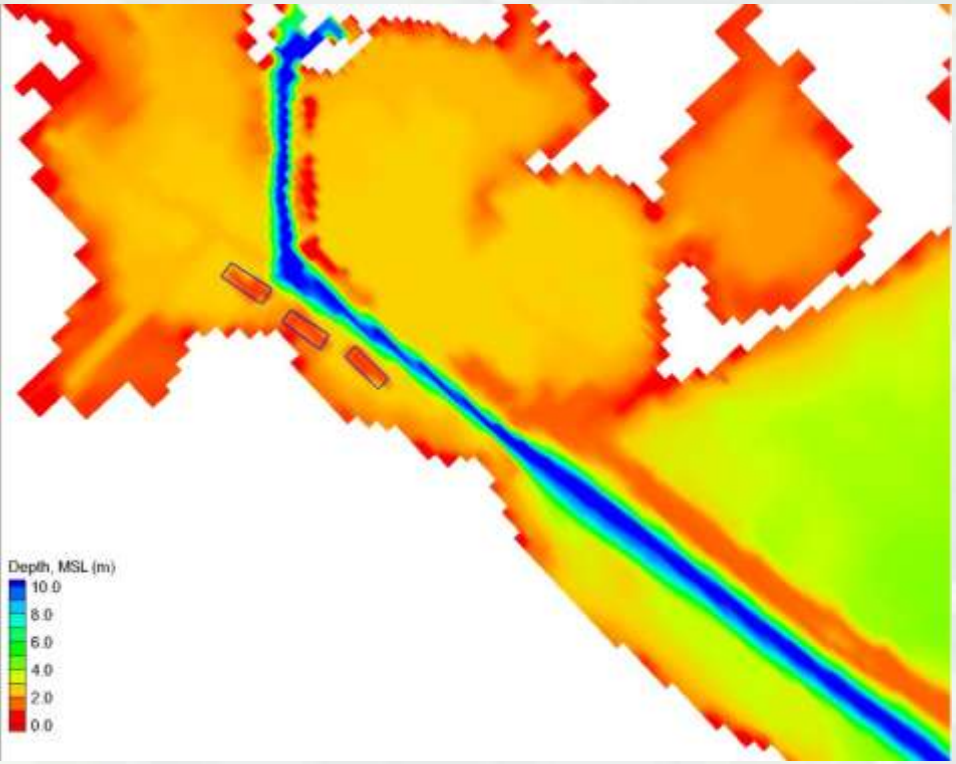
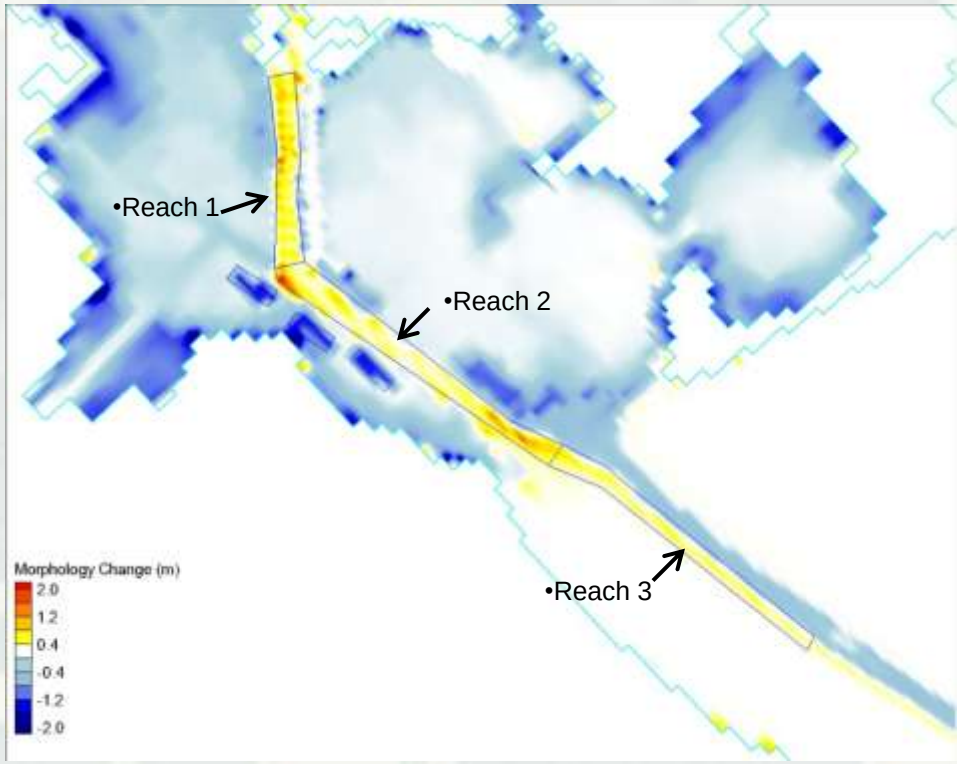
Morphology Change

•Alt 3: 3 New PAs - Sep 2006 to Feb 2007





•Initial depth

Cumulated depth change

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Calculated Sediment Volume Change

•Cumulated Sediment Volume Change (cubic yard), Sep 2006 – Feb 2007

Configuration	Reach 1	Reach 2	Reach 3	Reach 1-3	% Reduction
Existing	2.04	1.33	0.47	3.84	
Artificial Island	1.90	1.24	0.44	3.58	-7
Geotube	1.00	1.44	0.41	2.85	-26
3 New PAs	1.10	1.35	0.44	2.89	-25

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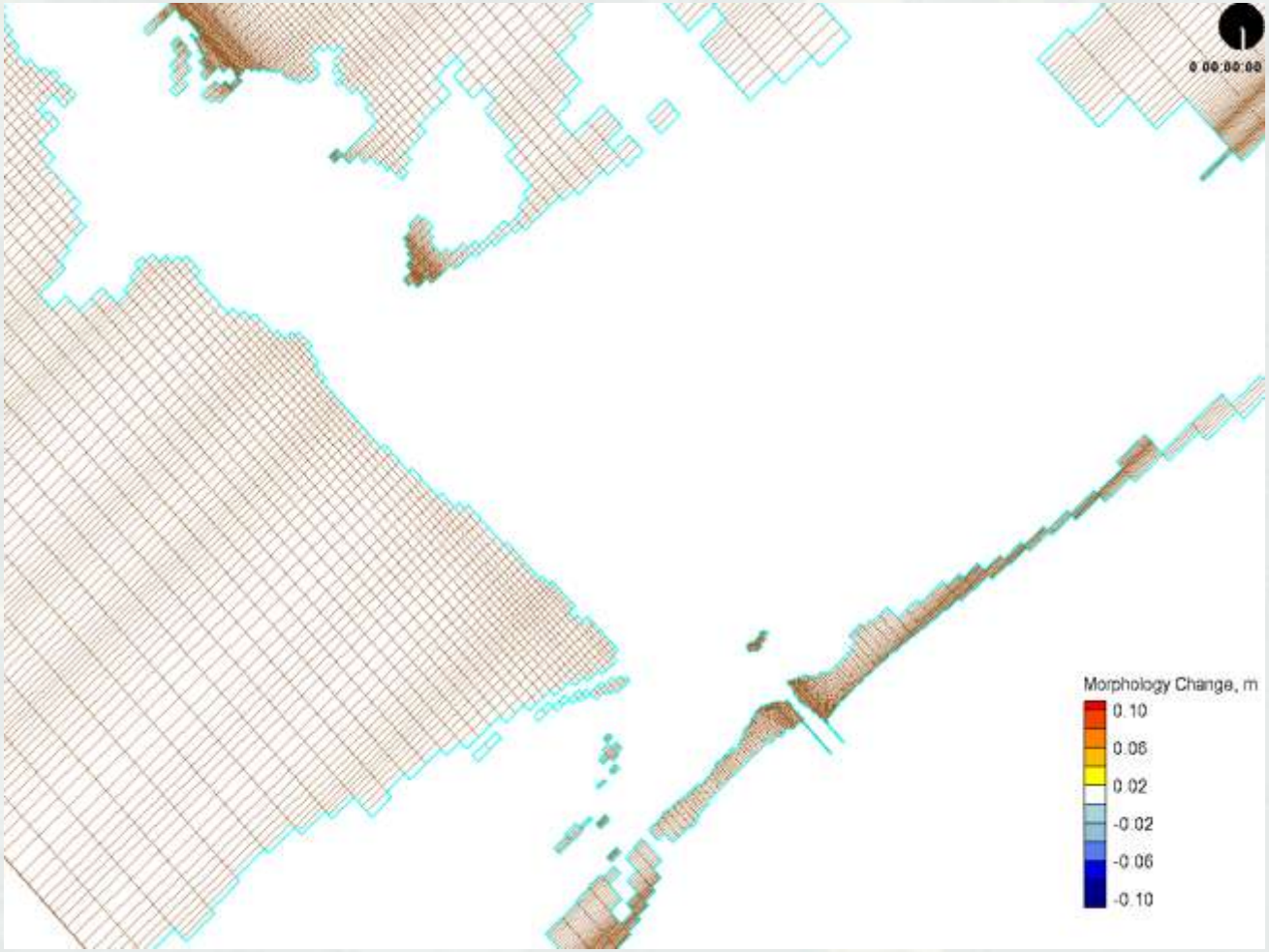
CMS Fluid Mud Flow



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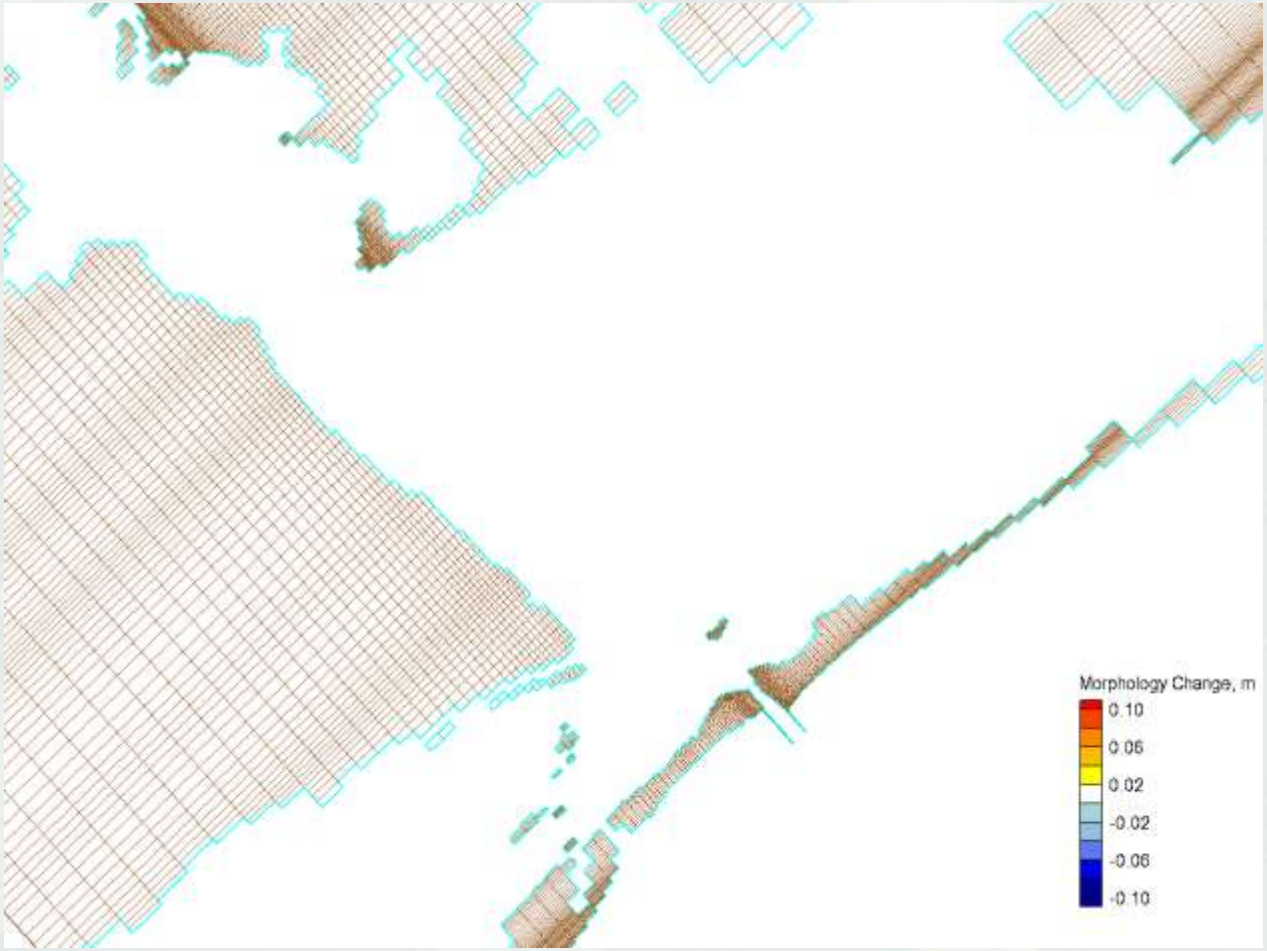
CMS - Sand Accumulation



Questions?

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Samantha Lambert, Hydraulic Engineer